PISGAH LAKE

2004 Fish Management Report

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INTRODUCTION

Pisgah Lake is a 62-acre impoundment located on Atterbury Fish and Wildlife Area (FWA) near Edinburgh in southeastern Indiana. It is one of nine small lakes and marshes on the property managed for fishing by the Department of Natural Resources (Figure 1). Only electric outboards are allowed. Two concrete boat ramps and two parking lots (one with a pit toilet) accommodate the public. A brochure of the property is available by writing to Atterbury SFWA, 7970 South Rowe Street, Edinburgh, IN 46124.

Construction of Pisgah Lake was completed in 1977. The Division of Fish and Wildlife (DFW) stocked the lake with bluegill, redear sunfish, largemouth bass, channel catfish, and northern pike. A regular catfish-stocking program was started in 1980 to maintain the channel catfish population, which was not expected to sustain itself through natural reproduction. Anglers have reported catching channels up to 21 pounds.

Gizzard shad, a species that has the potential to ruin sport fisheries in small impoundments, was collected for the first time in 1990 (Lehman 1991). In the 1990 and 1998 surveys, gizzard shad were found to be the dominant species by number and by weight. It was recommended that a low concentration of rotenone (a fish toxicant) be applied to the lake to selectively eradicate gizzard shad.

Approximately 17 gallons of NOXFISH rotenone were applied October 10, 2001. Thousands of shad were killed. As recommended, 12,400 largemouth bass fingerlings were supplementally stocked a few days later to beef up the predator population.

A spot-check survey was conducted at Pisgah on May 29, 2002 to evaluate the October 2001 shad selective. Approximately 50% of the shoreline was DC electrofished during the day with two dippers. No gizzard shad were collected. These results made the selective at Pisgah look very successful.

A second spot-check DC electrofishing survey was conducted at Pisgah on October 30, 2002 to further evaluate the shad selective. During one daytime lap with two dippers at Pisgah, 25 gizzard shad were collected. Twenty-three fish ranged from 6.2 to 10.2 inches and two fish ranged from 13.9 to 14.0 inches. Unfortunately, not all the shad had been eliminated in October 2001.

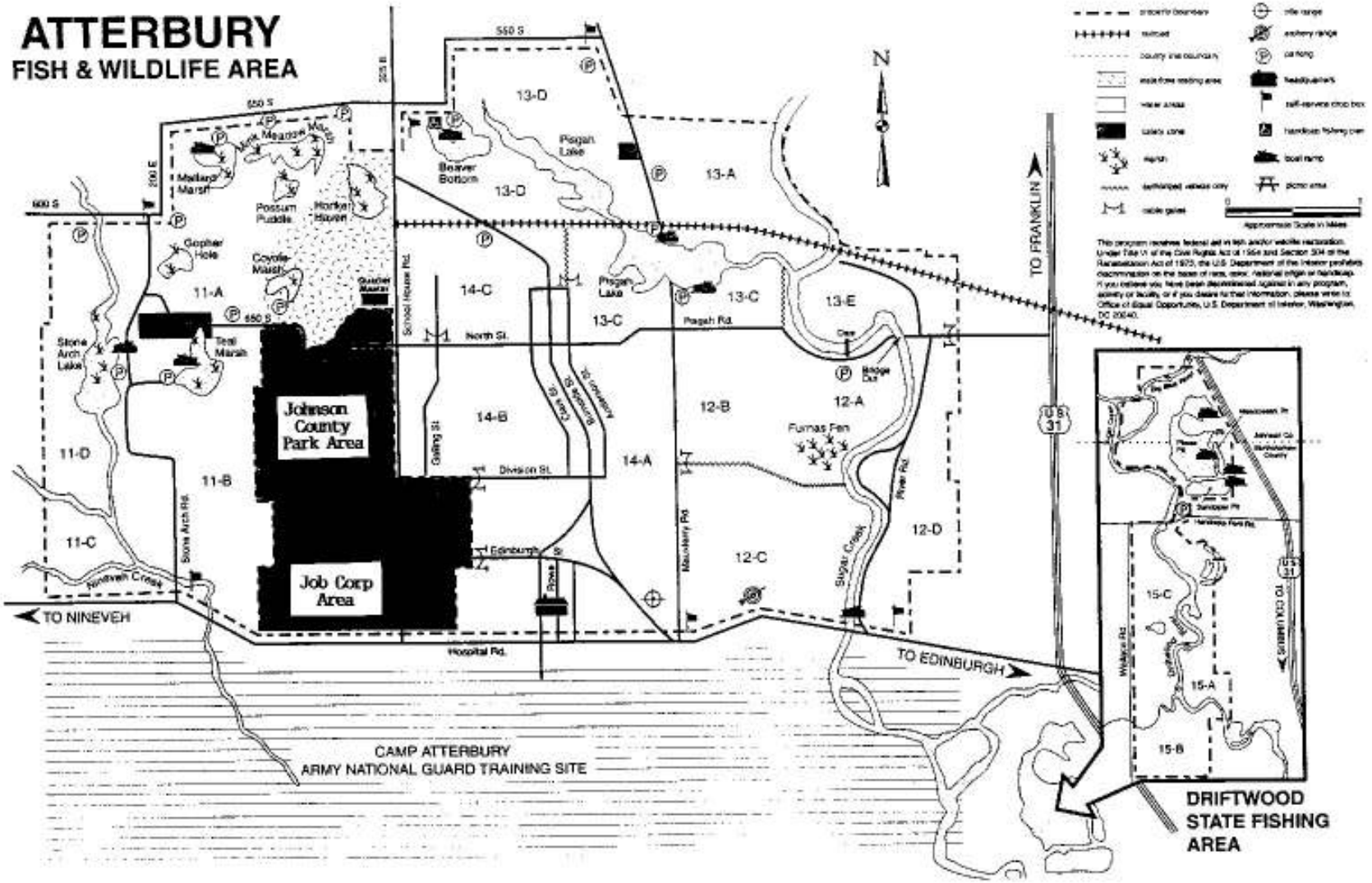

Figure 1. Map of Atterbury FWA showing location of Pisgah Lake.

METHODS

This survey was conducted on June 21-23, 2004, as part of DFW Work Plan 202478 that covers management of fish populations in impoundments, to evaluate changes in the fish population since the last survey in 1998. Some physical and chemical characteristics of the water were measured in the deepest area of the lake near the principal spillway. The effectiveness of the weed control program around the boat ramps was evaluated. Submersed aquatic vegetation was sampled on July 21 using guidelines written by Pearson (2004). Vegetation was identified on site or later in the lab.

Fish were collected by DC-electrofishing the shoreline of the main part of Pisgah Lake between the railroad trestle and the dam (Figure 1) at night with two dippers for 0.50 hour. One trap net and four experimental-mesh gill nets were also fished overnight. A global positioning system (GPS) device, GARMIN GPSmap 76, was used to record the location of the limnological data collection site, fish collection sites, and aquatic vegetation sample sites.

All fish collected were measured to the nearest 0.1 inch in total length. Average weights for fish by half-inch groups for Fish Management District 8 were used to estimate the weight of bluegill, gizzard shad, redear sunfish, largemouth bass, warmouth, hybrid sunfish, black crappie, and white crappie in the sample. Other fishes were weighed in the field to the nearest 0.01 pound. Fish scale samples were taken from selected species for age and growth analysis. Electrofishing catch rates include all age groups of fish unless stated otherwise. Proportional stock density (PSD) values were calculated using fish caught by electrofishing.

RESULTS AND DISCUSSION

Pisgah Lake is approximately 15 feet deep. The lake was at normal pool. Sunlight penetration of the lake's brownish-green water, as measured with a Secchi disk, was 26 inches. As is typical for southern Indiana impoundments in the summer time, Pisgah Lake was thermally stratified into warm and cold layers. Dissolved oxygen concentrations were not adequate for fish survival below 6 feet. This stratified and anoxic condition is corrected each year during fall turnover when the water in the lake is mixed by the wind and falling temperatures.

Submersed vegetation was found to a depth of 5.5 feet at some places along the shoreline. Coontail dominated the population, but curly-leaf pondweed (an exotic), American pondweed, and American elodea were found frequently throughout the lake. Aquatic vegetation is treated annually as needed to accommodate access by boat and shore anglers.

A total of 926 fish, representing 11 species and naturally occurring hybrid sunfish, was collected during this survey. Total weight of the fish sample was approximately 231 pounds.

Species collected in past surveys, but not in this survey, include golden shiner, grass pickerel, green sunfish, northern pike, rock bass, and white sucker.

Bluegill ranked first by number (58%) and second by weight (29%) in the survey sample. They ranged in length from 1.4 to 7.5 inches, averaging 5.5 inches. After a decrease in relative abundance by 21% from 1990 to 1998 (Lehman 1999), bluegill have increased by 245% from 1998 to 2004. For this survey, back-calculated lengths indicate bluegill reach 6 inches (quality size) during their fourth year of growth (Figure 2), which is comparable to 1998 and the average for southeastern Indiana. Of the 535 bluegill in this sample, 37% were 6 inches or longer compared to 63% in 1998 (adapted from Lehman 1999).

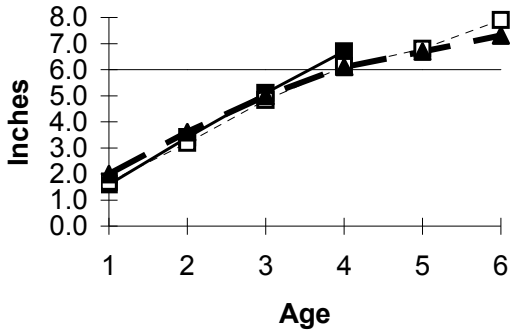

Figure 2. Pisgah bluegill growth from 2004 survey (solid line) compared to 1998 survey (dashed line) and to average bluegill growth observed in Fish Management District 8 impoundments (dotted line).

Balanced fisheries exhibit bluegill PSD values that range from 20 to 60 (Anderson and Neumann 1996). The PSD value for Pisgah bluegill is 30, which is within the range, but a 32% decrease from the 1998 PSD value of 44. This is a result of a greater proportion of smaller bluegill (3 to 6 inches) compared to quality size bluegill in 2004.

The Bluegill Fishing Potential Index (BFPI) is an objective rating system that was developed in Indiana to assess bluegill fishing in lakes and ponds (Ball and Tousignant 1996). Out of a possible 40 points in the index, the current bluegill fishery scored 15 points, which is in the “fair” category (Table). The BFPI score was identical in 1998 (15 points). Less than good growth and the lack of bluegill over 8 inches continue to play a major role in the BFPI score in Pisgah Lake.

Table. Range of scores for each category in the Bluegill Fishing Potential Index.

POOR	MARGINAL	FAIR	GOOD	EXCELLENT
0 - 7.0	7.1 - 12.9	13.0 - 18.9	19.0 – 25.9	26.0 - 40.0

Gizzard shad ranked second by number (26%) and first by weight (46%) in the sample. They ranged in length from 7.1 to 15.1 inches, averaging 10.7 inches. Compared to 1998, shad abundance in this survey has decreased 49% by number, but shad weight is nearly identical to 1998 due to shad's greater average length in 2004 (Lehman 1999). For this survey, gizzard shad growth is much greater than the average for southeastern Indiana (Figure 3).

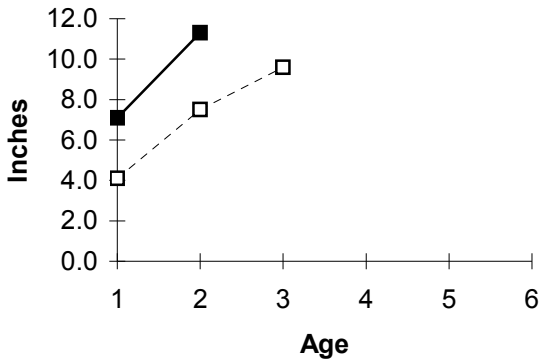

Figure 3. Pisgah gizzard shad growth from 2004 survey (solid line) compared to average gizzard shad growth observed in Fish Management District 8 impoundments (dotted line).

Redear sunfish ranked third by number (6%) and fourth by weight (5%) in the sample. They ranged in length from 4.0 to 10.3 inches, averaging 6.5 inches. Of 52 redear collected, 17 (33%) were 7 inches or longer (quality size), which is a decrease from 1998 where 66% (47 of 71) of redear collected were 7 inches or longer (Lehman 1999). For this survey, redear sunfish growth is greater than the average for southeastern Indiana (Figure 4).

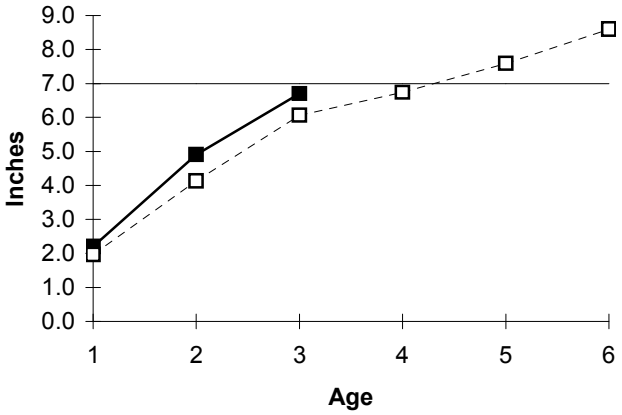

Figure 4. Pisgah redear sunfish growth from 2004 survey (solid line) compared to average redear sunfish growth observed in Fish Management District 8 impoundments (dotted line).

Largemouth bass ranked fourth by number (5%) and third by weight (11%) in the sample. They ranged in length from 5.1 to 19.1 inches, averaging 8.6 inches. Compared to 1998, bass relative abundance is the same (5%) although the electrofishing catch rate decreased by 16% (Lehman 1999). Bass growth is comparable to 1998, but still below the district average (Figure 5). It was not determined when Pisgah bass reach the legal size limit of 14 inches; the average for southeastern Indiana is during the sixth year of growth. Only five of 48 bass (10%) collected were legal size and only two were able to be aged (a 14.7-inch bass at age 4 and a 17.1-inch bass at age 5).

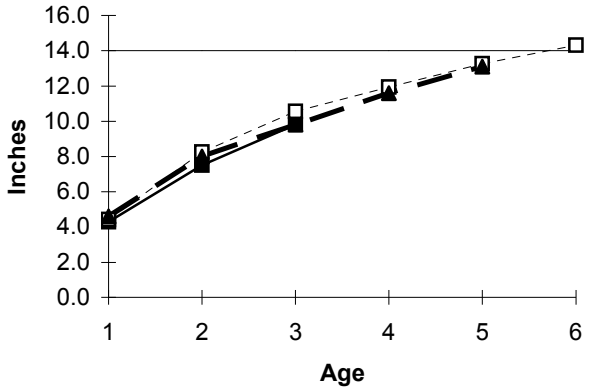

Figure 5. Pisgah largemouth bass growth from 2004 survey (solid line) compared to 1998 survey (dashed line) and to average largemouth bass growth observed in Fish Management District 8 impoundments (dotted line).

Balanced fisheries exhibit largemouth bass PSD values that range from 40 to 70 (Anderson and Neumann 1996). The PSD value of 40 for Pisgah Lake bass is at the low end of the range, but is a 20% increase from the 1998 value of 33. However, bass PSD values for both surveys are not reliable estimates because insufficient numbers of bass over 8 inches (stock size) were collected.

Twelve warmouth were collected, which are sometimes mistakenly identified by anglers as rock bass. They ranged in length from 4.3 to 6.6 inches. Two of these fish were 6 inches or longer.

Ten hybrid sunfish were collected. Most of these appeared to be naturally occurring crosses between bluegill and redear sunfish. They ranged in length from 5.8 to 7.2 inches. Only two of these fish were less than 6 inches.

Five channel catfish were collected in gill nets. They ranged in length from 13.0 to 18.1 inches. Based on their lengths, they should represent some of the catfish stocked in 2001 and 2003. The low number of channel catfish collected in this survey would seem to indicate good harvest by anglers.

Six black crappie and five white crappie were collected. Together, the two species ranged in length from 4.6 to 7.9 inches. Habitat conditions in Pisgah are more favorable to white crappie than black crappie, but white crappie numbers have greatly decreased from 52 individuals collected in 1998.

SUMMARY AND RECOMMENDATIONS

Pisgah Lake continues to provide fishing opportunities for bluegill and large redear sunfish. Bluegill numbers in the survey greatly increased from 1998, but no bluegill over 7.5 inches were collected. This lack of large bluegill may be the result of angler harvest and/or correlated with the presence of gizzard shad.

In spite of the attempt to selectively exterminate gizzard shad in 2001, shad are very abundant again. Approximately 26% of all the fish by number and nearly 46% of all fish by weight are gizzard shad which are of little use to anglers. Another negative effect of shad results from their competition with other fish for zooplankton. A large population of shad can eat so many of the microscopic animals that only a few of the young bass and bluegill, which also eat those small animals, can survive. This can lead to a decline in fishing.

Largemouth bass growth is slightly below average. Most of the bass in Pisgah Lake are

sublegal fish, so most bass fishing will be catch-and-release. The bass do not seem to be taking advantage of the abundance of bluegill and gizzard shad. The 14-inch minimum size limit should remain in effect to prevent over-harvest of largemouth bass, the primary source of predation on Pisgah's small panfish.

Pisgah Lake is scheduled to be surveyed from 2005 through 2009 under DFW Work Plan 204034, which is titled, "Gizzard shad experimental management strategies." The work plan objectives are:

1. Report on how the illegal introductions of gizzard shad have negatively affected sport fish populations and reduced fishing opportunities.
2. Determine the most effective way(s) to control excessive gizzard shad populations.
3. Determine how sport fish populations respond to various gizzard shad management techniques.

Pisgah will be surveyed from early to mid-June each year. Only largemouth bass, bluegill, and gizzard shad will be collected. The management activity being tested at Pisgah is a selective gizzard shad eradication every 2 to 3 years. Following the selective, the lake should receive a supplemental stocking of largemouth bass fingerlings at the rate of 100/acre or 6,200 fish total.

Prior to this survey, 12,724 catfish had been supplementally stocked by the DFW from 1980 through 2003. The DFW should continue to stock channel catfish every two years as long as it is felt that channel catfish should be managed in this manner. Channel catfish should average at least 8 inches in length when stocked to reduce predation by bass. The next stocking is scheduled for the fall of 2005. It is also recommended that vegetation control efforts be continued on an annual basis as needed to accommodate anglers and to manage the fishery.

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